

SEQUENCE LISTING

SEQ 1: *Arabidopsis thaliana* GAD1

1 atggtgtct cccacgcggc atcgaggatcg gacgtctccg tccactccac attcgcata
 61 cgttacgtcc gtacttcaact tcctaggatc aagatgcggg aaaactcgat tcctaaggaa
 121 gcgccgtatc agatctaa cgcacgtcg atgtttgacg ggaatccacg gttgaactta
 181 gcctccctt tgacgacatg gatggagct gagggtgata aacctcatc gtcctccatc
 241 aacaagaact atgttgatc ggacgtatc cccgtacca cccgaacttcgaaacccatgt
 301 gtgaatcgatc ttgcacatc attcatacgca cccgttagaa agggggagac cgcctcgga
 361 gttagaaccg ttggatcatc ggaggccata atgttggccg gtttggctt caaaggtaaa
 421 tggcagaacc agcgcacaaatc tgaaaggcata aaccgaatc aaccgaatc tggcaccggaa
 481 gccaatgttc aagtgttgg gggaaatc gtcaggatct ttgagggttga acttaaggaa
 541 gtgaaatgg tgaaaggata ctatgtatg gaccctcaac aagctgttga tatgttgtat
 601 gagaacacca ttgtgttgc ggacatctt ggttccactt ttaatggaga attcggaaat
 661 gttaaactct tgaacatc ctgttgatc aagacaacaa aacccggatg ggatcacca
 721 atccacgttgc atggcgaatc ttggaggatc attgcacgtt tttgtatcc ggaattggaa
 781 tgggacttta gacttccctt gttgttggatc atcaatgttga ttggtttacaat gatgttggact
 841 gtgtacgcg ggattgttgc gttgtatcgg aaaaacaaatc agggatttgcg tgaggactc
 901 atctccatac tcaatctatc tgggtgtgc caaccacccat ttactctcaa ttctccaaa
 961 ggttcaatgc aagtctatc tcaatctactc caacttatac gatggggcca cgagggttac
 1021 agaaatgttga ttggaaatgg cagagagaatc atgtatgttgc taaggaaagg atttggaaag
 1081 acagaaatggatc tcaatctatc ctggaaaggatc gagggtgtgc cacttgcg ttttcttgc
 1141 aaaaatgttca gctgtcacatc tggatgttgc atctccgaca tgcgttgcg gatgttggat
 1201 atatggccgg ctatccacataatc gtcacacacata tcaatgttgc tgggtgttgc
 1261 atcagagaaatc attttgcgaaatctcgatc gagagacttgc tgatcgatc atagaaatgg
 1321 atgcgttgcg tgcgtatgttgc tggatgttgc aaaaatctactc tggacaaatgg
 1381 aagatgttgc atcaacacgcgtaaattttgttgc gtcacgttgc agaagagacgatc ttcgttgc
 1441 cagagagatc tcaatctatc tggatgttgc tggatgttgc acaggaaatgg gacgttgc
 1501 atctcttgc

SEQ2: *Arabidopsis thaliana* GAD1

MVLSHAVSESDVSVHSTFASRYVRTLSLPRFKMPENSIKPKEAAYQIINDELMLDGNPRLNLASFVTTWME
 PECDKLIMSSINKYVNMDEYPVTTTELQNRVCNMIAHLFNAPLEEAETAVGVGTVGSSEAIMLAGLAFK
 RKWQNKRKAEGKPVDPKPNIVTGANYQVCEWEKFRYFEVLELKEVKLSEGYVVMDFPQAVDMVDENTICVA
 DILGSTTLNGEPEFDVKLLNDLVEKNNKETGWDTPIHVDAASGGFIAPFLYPELEWDFLPLVKSINVSGH
 KYGLVYAGIGWVIRNKEDLPHINYLADQPTFTLNFSKGSSQVIAQYQQLIRLGHEGYRVNME
 NCRENMIVLREGLEKTERFNVSKDEGVPLVAFSLKDSSCHTEFEISDMLRRYGVIVPAYTMMPPNAQH
 TVLVRVIREDFSRSLAERLVIDIEKVMRELDEPSRVIKHISLGQEKSENSDNLMVTVKSDIDKQRD
 ITIGWKKFVADRKKTSGIC

SEQ 3: *Arabidopsis thaliana* GAD2

1 ctaaacacaa acaaagatgg ttttgacaaa aaccgcacacg aatgtatgttgc tctgttgc
 61 catgttgcgaa tctcgctatc ttgcactac acttccaaatc tatgtatgttgc gttgatgttgc
 121 gataccggaaa gacgttgcatc atcaatgttgc aaaaatgttgc ctgtatgttgc atgttgc
 181 gaggttacatc ctgttgc tttgtatgttgc attgtatgttgc ccaggatgttgc acaaaatgttgc
 241 catgttgc tcaacacaaatc actatgttgc tatgtatgttgc tttgtatgttgc caactgttgc
 301 ccagaacccgaa tttgtatgttgc ttatgttgc actgttgc tttgtatgttgc gggccacttgc
 361 gacgttgc gggatgttgc cttgttgc tttgtatgttgc atcaatgttgc ccaggatgttgc
 421 ctcaaaaatc aatgttgc acaacacaaatc ggttgc gggatgttgc aaaaatgttgc acaaaatgttgc
 481 cttgttgc tttgtatgttgc tttgtatgttgc atcaatgttgc ccaggatgttgc acaaaatgttgc
 541 ggatgttgc tttgtatgttgc tttgtatgttgc atcaatgttgc ccaggatgttgc acaaaatgttgc
 601 agaaatgttgc gacgttgc acaatgttgc tttgtatgttgc tttgtatgttgc acaaaatgttgc
 661 tgatgttgc gacgttgc acaatgttgc tttgtatgttgc tttgtatgttgc acaaaatgttgc
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 781 tttgtatgttgc tttgtatgttgc acaaaatgttgc tttgtatgttgc acaaaatgttgc

841 caagtatgga ctggctatg ctggatattgg ttgggtcggt tgaggggcag caggaggattt
 901 ggcctaaggt ctatcttc atattaattt tcttgggtct gatcaacccca ctttccatct
 961 caattttccc aaggatcgta gccaattttt tgctcaatac taccagtc ttcgttctgg
 1021 attcgagggg taaaatattt tgatggagaa ttgcatacg aacatgttgg ttcctcaaga
 1081 agggatagaa aaaaacagac gtttcaacat agtctcaag gccaacaggag tgcgcgtc
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 1201 tcgttttggc tggatcgccc agatggatc acatgttgc gatgcacaggc acatcagg
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 1321 tatttcgaag gtgtttcatg agttagatc ctggcccttc aagatatctt aagaatgtgg
 1381 aataaaagggt atccggaaa atgttataaggaa gaaagatgtt gagaaggaa ttctgttgg
 1441 agttatgtt ggatggagaa agttgttggaa ggagggaaag aagatgttgg gtgtgtc
 1501 agcaatgtt ggatggagaa agttgttggaa ggagggaaag aagatgttgg gtgtgtc
 1561 agttatgtt ggatggatgg tttttttttt tttttttttt tttttttttt tttttttttt
 1621 cattttaaatggc cattttttttt tttttttttt tttttttttt tttttttttt tttttttttt
 1621 cattttaaatggc cattttttttt tttttttttt tttttttttt tttttttttt tttttttttt

SEQ 4: *Arabidopsis thaliana* GAD2

MVLTKTATNDSEVCTMFGRYVRTTLPKYIEGENSIPKDAAQYIQLDEMLDGNPRLNLASFVTTWMEP
 ECDKLIMDSINKNYVDMDEYPVPTTELQNRCVNIILARLFNAPLEESETAVGVGTVGSSEAIMLAGLAFKR
 KWQNKRKAEGPKPYDKPNIVTGANVQVCEWEKFARYFEVELKEVNLSSEGYYVMDPDKAAEMVDENTICVAA
 ILGSTLNFGFEDVVKRLNDLLVKKNEETGWNTPIHVAASGGFIAPFIYPELEWDFLPLVKSINVSGHK
 YGLVYAGIGWVWVRAAEDLPEELIFHINYLGADQPTFTLNFSKGSQIIAQYYQLIRLGFEQYKVNMMEN
 CIENMVVLKEGIEKTERFNIVSKDQGPVVFSLKDHSHFNEFEISEMLRRFGWIVPAYTMPADAQHIT
 VLRVVIREDPSRTLAERLVAIDISKVLHELDLPSKISKMMGIEGIAENVKEKMEKEILMEVIVGWRKF
 VKERKMMNGVC

SEQ 5: *Arabidopsis thaliana* GAD3

ATGGTTTATCTCTAAGCACGCTTCAACATTCAGTGAATTCAACATTCACATTGGCTTCCCGTTATGTC
 CGCAACTCTATCTACCGGTAGAACAGTTGAAACACAAATTITATTATTGTTTAATGTTTCAATTGGTA
 GAGTTCTAAACTTAAATGCTAGACGACGATACACAGCATCTGATTCAGATTCAATATTATTACAGAA
 ATATTATTATTAAATATGCTAGATAGTCCAGATTTTAATTATTGGGTACATAAGAAAGATACTAGAT
 TCTAACGAAATTAAACCACTTGCACCTGAAAGATCAGCAGCATAAATGGTGTGTTACTATATAAGGGTATT
 CTTTTTAACTCTAACTTAAATATCAATTCTACAGATTCAGATTCTGAGCTAAACCGGAGCTAAACCTGGCT
 AGGAAGCAGCAGTACCAAACTTCACAGCAGCAGCATCAAGCTTGTGAGCTTGTGAGCTTGTGAGCT
 CCTTTGTCACCACTTGGATGGAGCCAGAAATGTGACAAGCTATGATGGAATCCATCAACAAAGAACAAAG
 TTGAGATGACCAATACTCCCTTACCCAGCAGCTTCAAGGATGCTATGAGCTTGTGAGCTTGTGAGCT
 TCAACGGCCCTTTAGGTGACGGTGAAGGCCCATTTGGTGTGGCACGGTGGGGTCACTCGGAGGCACTGA
 TGTGCGGCGACTGGCCCTTAAAGAGACAGTGGCAGAACAGCTTAAGGGCTTAGGGCTGCGCTTATGATA
 GACCTATAATGTTGACCGGACTAAATTCAGTAAAGACAAACAAAATTTGATTAATTTAAACCGG
 TTAGGTCTATTTTATTTGATGAAATATAAAACTTAACTTACAGGTTTGTGAGGAAATTTCGAAGGT
 ATTTGAGGTTGAGCTTAAGGAAGTCAAGCTGAGAGAAGGATATTACGTTGATGGACCTGACAAGCGG
 TTGAAATGGTAGACGAAACAACTATAGCTGGCTGGCCATTCGGTTGCGACACTAAACCGGAGAAATTG
 AACAGCTTAAGCTCTCAACGACCTTTAGTCAGTGGAGAAACAAAGAACACGGGTTATGAAATCAAAC
 AACTAAACAAATTTTATTTATACATTGTTGCTTAAAGGTTTACACATTCTAACGTTGAGATATATTGCT
 TAAAGAAATTATTATTTGATGAAATATAAAACTTAACTTACAGGTTTGTGAGGTTTACATGTTTACATT
 ATATGCTTCTTGTATCGAATGGTTTTAAATACTGATTTAAAGGTTTGTGAGGTTTACATGTTTACATT
 ATTTATAATGAGATATTCAAGCATTCTAATATCAAACCGGATAACAAACAAACTGATTATTAATT
 ATTTAACCGGTTTTGGTTCCCGGTTAAATATTGTTGTTAGATGGGATATCGCCGATTACGTTGGACCGACGGA
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 GCATAATGTTGAGTGGCTTCAACAAATCGGTTGGTTTACGCTGGTACATCGGTTGGGTTGCTATGGAGA
 AACCGGTTTGGCTGTAGAACCTTCTCCATATCAATATTCTGGAGCTGATCAACCCACATTACCC
 TCAACTCTTAAAGGTACATACCAATCTATGTTAGAAGTTTGTGAGATATATTGAGTTAATGTTTACATT
 TTAAATTCTTGTATATTACCCAGGGTCAAGTCAAGTGAATGCTCAGTACTACCGAGTGTGATTGCTTGGGAT
 TCGAGGTTAAATAACTCAATAAGAAACTAAACAGTTACTAAATCCAACTGATACGTTACTAGTATA
 ATATACAAGTGTGTTACTATACATTGACTACAAAAGTCAAAACCAAGAAATGTACTAAATACATTCA
 TAAGGTTAAACGTTCTAAATTGACAGTTTGTGTTTGTGAGAATAGCTAATAATCTTTTGTGTTGGTT

TAGGGATACTGCAACGTCATGGATACTGGCCGAGAACATGATGGTACTAACAGAACGGATTAGAGAAA
 ACGGGACGTTTAACATCGCTCCAAAGAAAACGTTTCCCTTAAGTGGCTTTCCTCTCAAAGATAGT
 AGGCCAACGACGAGTTCGGAGGTGGCGGAACATGCTCTGCTCGCTGGATCGTCTCCGGCTACACG
 ATGCCCTGGGATGGCCAACTGTCACGTCCTTCGAGTTGTTACAGAGCTCGATACGCTTCCCGCAGGGTTCAC
 GCTGAGAGATTGGTAGCGGATTTCGAGAAAGGTTACAGCTGTTAACAGGAGCTACAGCTGCTCCGGCAGGGTTCAC
 GCAAGAGTGGCTAGTGGAAAGGTTAACGGGTTAACAGGAGCTAACAGGAGACGCCAAAGAGAACGTCAG
 GCTACTGGAAAGAAGTTGTGACACTAACAGACTGACAAGAACGGCCTTCGGTTAGTAGCAAGTATTACCA
 AATCAATGAA

SEQ 6: *Arabidopsis thaliana* GAD3

MVLSKTASKSDSIHSTFASRYVRNSISRFEPKNSIPKEAAYQIINDELKFDGNPRLNLSFVTTWME
 PECDKLMMESINKNVMDPEYPTVTLQNRVNMIARLFNPLGDGEAIVGVTGSSAIVMLAGLAFK
 RQWQNKRKAQGLPYDKPNIVTGANVQCVWKEFARYFEVELKEVNLREDDYVMDPVKADEVMDENTICVA
 AILGSTLTGEGFEDVKLLNLLVEKNKQTGWDPTLPHDAASGGFIAPFLYPDLEWDFLPLVKSINSGH
 KYGLVYAGIGWVWRTKTDLDPDELIFHINYLGADQPTFTLNFSKGSSQVIQAYQYLIRLGPEGYRNMD
 NCRENNMVLRLQGLEKTRPNIVSKENGVLVAFSLKDSSRHNFEVAEMLRFGWIVPAYTPADQHV
 TVLRVVIREDFSRTLAEERLVADEFKVLHELDLTPARVHAKMSKGKVNKGKTPPEETQREVTAYWKKFVD
 TKTDKNGVPLVASITNQ

SEQ 7: *Arabidopsis thaliana* GAD4

ATGGTTTGTCTAACAGACAGTTCCGAATCTGATGTCCTAACCTCAACTTTGCTTCGTTACGTC
 CGCAACTCTTCCACGGTAACAACTTGTAAACACAAATCTTCTCTAACATGTTCTGCAACAAATAGTA
 ACATGTAATGATGTAACCTGGATAGTTTTTTTGGCTGCTGTTATGTTAGATTATTATGTTG
 TTATATACATATAAGGAGGACATGTTCTGTTATGTTAACTTAACTGATCATCATTTCATCATTAGATTG
 GAAATGCCCTGAGAACTCAATCCAAAAGAACGAGCTTACCAAATCATCACGACGAGCTAATGCTCGAT
 GTTAACCCAAAGGCTAACCTGCTCTCTGGTACCCATGCTGAGCTGGAGCCAGAAATGTGACAGCTCATG
 ATGGAGTCCATCAACAAAGAACATGCTCGACATGCGACATGGACAGTAGCTCTGACCAACTGAGCTTCAGAACCGA
 TGTGTTAACATGATAGCAGCTCTTCACAGGCCCGCTTGGTACGGTGAAGCTGCCCTGGTGTGGC
 ACCGTCGGATCTCGCCGGCGGCTATTGTTGGCCGGTTGGCTTTAACAGGACAATGGCAGAAATAAGCGT
 AAGGCCAAGGGCTCTCTATGATAAGCCCCAAATCTGTAACCCGCTTAATGCTCAGGTTAAACCAAAAC
 AAAAATTGTAAGAAATTAAACCAAGAACAAAATTGAAATTATCAGGTTAACATCGGTTAACTTATGTTGACCTC
 AATTTCGGCTTCAATACAGGTTCTGGTGGAGAACATTGCGAACAGGTATTCTGAAGTGGAGCTTAAAGGAAGT
 GAAACCTAACAGAAAGACTATTACGTGATGGACCTGTAAAGGCGCTGAAATGGTAGACGAAAACACAAAT
 TTGTCGCTGCCATCTCGGTTAACCTGGTAAACGGTGAATGGAGACGCTTAAAGCTCCCTAACAGGACT
 CCTTGTGAGAAAACAGCAACCCGGTAATTAAACCAACCCGAGAAAACAGCTTAATATCGATTTGAA
 TCGGTTTGAGTTGGCTTAACTGCTAACAAACATAATTGCGATGGACACGCCAATACCGTGGAC
 GCAGCGAGTGGTGGGTTATTCCTGGCTTCTGGTATCCGGAGCTGGAGTGGATTTCGGCTTACCGCTT
 GTTAAGAGTTAAATGTGAGTTGTCACAAATACGGTTTGGCTTACCGCGTATTGGTTGGGTTGTATGG
 AGAAGCTAACAAACCCGTAATTGCGTATGAACTTCTCCATATCAATTATCTGGCGTGAATCAACCAAC
 TTACACTCAACTCTCCAAAGGCTACATACCATACATGATGTTAACATATAACTTCAATAATATT
 TGGTGTGATGAAATTGTTATAGACTAACATTGAGTATGCTGTATAAACAGGTTCAAGTCAAGT
 ATTGCTGAGTACTACAGCTGATTGCTCTGGAGTGGAGAAATAAAACTCAAATACCGTAAATATT
 TACCAAAATGGCTAACAAAGAACAGTAACTGTTATGTTGTTACTGTTACTATACCTTGAAT
 TAAACGTTCTAACATGACTGTTTGTGTAATTAAATATGTTTCTGTTGATITAGGGT
 TATCGCAATGTTGATGGAATTGTCGGGAAACATGATGTTACTAACAGAACGGATTAGAGAAAACCGGA
 CGTTTAAATACGCTCCAAAGGAAACAGGTGTCCTGGCTTGTGGCTTTCTCAAAAGATAGTGGCGC
 CAAACAGGAGTGGAGGTGGCCCATACCTTCGCTGGCTTGGCTGATCGTTCCGGCTACACGATGCC
 GCGGATGGCAGCATGTCAGTGTCTCTGGAGTGTATCGAGAAGATTTCTCTGAACCTTAGCCAG
 AGATTGGTAGCTGATTGCGAGAAGGTTCTACACGAGCTCGATACGCTTCCGGAGGGTTCAAGGCCAAG
 ATGGCTAACATGGAAAGGTTAACGGTGTAAAGAAAGACGCCAGAGGAGACGAGAGAGAACGTCACGGCTAC
 TGGAGAAGTGTGAGACTAACAGAACGCCAACAGAACACAATTGCTAA

SEQ 8: *Arabidopsis thaliana* GAD4

MVLSKTVSESDVSIHSTFASRYVRNSISRFEPMPENSIPKEAAYQIINDELMDGNPRLNLSFVTTWME
 PECDKLMMESINKNVMDPEYPTVTLQNRVNMIARLFNPLGDGEAIVGVTGSSAIVMLAGLAFK
 RQWQNKRKAQGLPYDKPNIVTGANVQCVWKEFARYFEVELKEVNLREDDYVMDPVKADEVMDENTICVA
 AILGSTLTGEGFEDVKLLNLLVEKNKQTGWDPTLPHDAASGGFIAPFLYPDLEWDFLPLVKSINSGH
 KYGLVYAGIGWVWRTKTDLDPDELIFHINYLGADQPTFTLNFSKGSSQVIQAYQYLIRLGPEGYRNMD

NCRENMMYLRQGLEKTGRFKIVSKENGVLVAFSLKDSSRRHNEFEVAHTLRRFGWIVPAYTMPADAQHVT
TVLRVVRIFEDRSRTLAERLVADFEKVLHELDTLPARVHAKMANGVKNGVKKTPEETQREVTTAYWKLL
TKTKNTKNTIC

SEQ 9: *Arabidopsis thaliana* GAD5

ATGTTGACTCTGGCAACCAACTCTGACTCCGAGCAGCATTGCACTTGCATTTGCTTAGATATGCGT
GCTGTTGTTCCCAAGGTTGGACAGGTTTGGCCATTTAGTTTAACTCTGTGATGCTACATTGTT
ATATATTTAATTTATTTATGACTCTGTTCCATATTTGAAACAGGTTCAAGAATCTGGCATTCTGCA
CCAAAGATGCTGCTTATCAATGATCAATGAGCTTGTGACTTGTATGGTAATCCCGAGGTTAACCTA
GCCCTCTTGTGCAACCCTGGATGAGGACCTGAGCTTGTGAACTCATCTGATGGTTCTGTAAGAAC
TATGTTGATATGGATGAAATCTGTCACCAGCTGAGCTTGTGAACTCATCTGATGGTTCTGTAAGAAC
CTCTCCTATCTTCCACTTGGCTAGTCTAGATCATACATCTTATCTGGCTTATTTCTCAGAACGG
FGTGTGAAATATGATGAGCAACCTGTTCCATGCTCCCGTGGAGAACAGGCTGCTATTGGGTGTT
AACTTGTGGTCTATCTGAGGCTATAATGCTGCTGGTTGGCTTCAAAAGGAATATGGCAACATAGAG
AAAGCTCAGGGCTCTACATTTGATAAGGCTAACTATGGTCACTGGAGCAAACTGGTCAAGGTT
TTACTTATTCTTCTCCTCAACAAACCATCACATTGGCTTGGAGTGTATGCTTCTTCTTCAATTAAT
ACATTTCTACAACTTGTGATCCCGCTCAGGTGCTGGTGGAGAACTTGGCAAGGTTCTGGAGTGG
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GAGAATACCATCTGTGTCAGCAATTCTGAGTACCATCTACTGGAGAGTGGAGCCTTACAGCA
TTGAGACGATCTTCTAGTGGAGAACTTGGAGAACAGGAGCTGGAAACTCTTACATCTGTTGATGCC
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AGTATTAACCTCAGTGGTCACAAGTATGGACTTGTCTATGCGAGGTTGGTTGGGTGCTGGAGAAG
AAAGATGATTGGCCAGGAGGACTGTCTCCACAACTACTTGGAGACTGATCTGGAGGACTTCT
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CATTCTCTCAACAGACTGGACAGCACCGGTGTTGGAGTACCTGGAGGTTGGCTTCAAGGAG
GGATCATACGGGCTTACACTATGGCTCAGATGACAGCACACATTGCTGCTCAGAGTTGTGATAAGAG
AAAGACTTACGGGCTTCTGAGATAGACTCATCACATACTGGAGTCTGGCTGAGGAAAGGATTGAAG
GGCTTCTAGCAGGATTGACATCTGGCTGGGGCTGGCAGGGTTGGTGTGATGTAAGAAGCTTAAAG
TGAAGAACGTCCTCAAGGATGTCCTTGGAGGATATCATACTAATTTGGAAACGCCCTTGTGAA
CTACAGAACAGGTTATGCTTCTGAGATGAGCTCATCACATACTGGAGTCTGGCTGAGGAAAGTAAAG
ATATTCTGCTGAA

SEQ 10: *Arabidopsis thaliana* GAD5

MVLATNSSDSDEHLHSTFASRYVRAVVPRFKMPDHCMCPKDAAYQVINDELMDGNNPRNLNLASFVTTWMEP
ECDKLIMDSVKNVYDMDVEPYVTTELQNRVCVMIANLHFAPVGEDEBAA1GCTGVSSAE1MLAGLAKFR
WQHQRRAQGLP1DKPNVFTGAVQCVCEWKFARYFVEKLVSEDDYYMPDAKAVEMDVENTICVA
ILGSTLTGVFEDVQLNDLAEKAETGWETPIHVDAAASGGFLAPFLYPDLEBDFRPLWVKSINVSGH
YVHUYAGCVGFWWVWRKTQDDEPEELVNLINHGLYDAGQZPTFLNFSSGHSQIAQYQYFGEYKGN
CMDNARRLREGIEMTGRKFNIVSDIGVPLVAFSLDKSSXFTETAEASLRKGFWI1PAYTMAPDQAQHIA
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KHLERHKNV

SEQ 11: Tobacco *NtGAD1*

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1  aaatatctc cattttctc cttgttttag tctctgtatct tcccgctgt actaccacca  
61  ctacgcggcc atggtttctgtt ccaaggacagg gtcggaaagt gagcttccca tccactccac  
121  ttccgttcc ctatgtatgtt gttatcttc tccggagggtt aagatgcgg agaatatgtat  
181  accaaaaggaa gcgcataatc aaatcataaa tgatgagctt atgttagatgaaatccaa  
241  actaaatttttaa gatcttttttgcacaaatcgatggaaacca ggtgttataa aactgtatgt  
301  ggatccatc aacaaatgtt acgttgcacat ggtatataatc cttgttaccaa ctgtactt  
361  gaatcgatgt gttaaacatgtt tagctcattt gtttaacgc cccacttgaggatggagagac  
421  tgcagtgttggaaatgttggaaactgttggatcttc tgaggatctt atgttgcgtt gattagtctt  
481  caagaaaaaa ttggcaaaatc aaatgttggaaatgttggaaactgttggaaatgttggaaatgtt  
541  tgtcaactgtt gccaatgttcc aggtgttggaaatgttggaaatgttggaaatgttggaaatgtt  
601  gctaaaggaa gttaaatgttggaaatgttggatcttc tgatgttggaaatgttggaaatgttggaaatgtt  
661  aatgttggaaatgttggaaacacaaatgttggatcttc tgatgttggaaatgttggaaatgttggaaatgtt
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SEQ 12: Tobacco NEGAD1

MVLJSKTAESDVSIHSTFASRYVRTSLPRFKMPENSIPKEAAYQIIINDEMLDGNPRNLNASFVTWME
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RKRWNKMAQKGPKCDPNUITGANCQVCWKEFARYFEVELKEVLSLDGYYVWMPDEKAVEMDENTICVA
ALIGSTLNGEEFEDVKRNKLDDLEIKNKETGWDTP1HVDAAASGGPIAPFPELEWDFRPLPVKSINVSGH
KYGLVYAGIWAIVWRNKRLDPLPEHFLINYLGADQPTFLNFQKGSQSSVIAQYYQQLRLFGEGYKVN
NCQENARVLREGLEKSGRFNIISKEI1GVLVAFSLKDQNSHNEFSETLRRFGWIPAYTMPPNAQAHV
TVLVRVLSFDSR7LAEERLVIDIEKVLDLTLPARVNAKLVAEANGSGVHKKTDRREVQLEITTAWKK
FVADKKKKTTNGVC
FVADKKKKTTNGVC

SEQ 13: Tobacco *NEGAD2*

SEQ 14: Tobacco NtGAD2

MVLVSKTASESVDVHSTFASRYVRTSLPRFKMPENSIPKEAAYQIINDELMLDGPNRNLASFVTTWME
RNLVTTLMMDSINKYVMDVEYFPUTTEQLNRCVNMIAHFLNPAQGLDGETAVGVTGVGSSEIAJMLGRK
RKWQNKMKAQGKFDPKVNITVGTANQVCWKEFARYFEVELKEVLSLDGYYVWMPDEKAEMDENTICVA
ALGSLTGTEFEDVWRNKEFLDPELIFKHNTEKWDTPIHVDAAASGGFIAFPFLYPELEWFDRPLPLEKSINVSGH
KYLGLVYAGIWEIWRNKEFLDPELIFKHNTEKWDTPIHVDAAASGGFIAFPFLYPELEWFDRPLPLEKSINVSGH
NCQENARVLREGIEKSGRFNIISKEIGVPLVAFSLKDQNSHNEFSETLRRFGWVILAYTPTMPNAQH
TVLRVLLFEDRSRTLAAERLVIDIEKVFHGVDTLPARVNAKLVAEANGSGVHKKTDRREVQLEITTAWLK
FVADKKKKTTNGVC

SEQ 15: Petunia GAD

SEQ 16: Petunia GAD

MVLSTKTSQSVDIHSFVVRITSLPRFKMPDNSIPKEAAQYIINDELMDGNPRLNLSFVTTWME
PECDKLMMDSINKNYVMDPEVPTTLEQNRVCVMIAHHLNPALEDEGTAVGVGTVGSSEIAIMLAGLAFK
RKWQNQKMAQGKPCDKPVTGANCQVCWKFARYFEVELKEVLSSEGVYMMDEPAKEVADMENDTICVA
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KYGLVYAGIWWVNRKNDLPELIFHNLNFGADQPTFLNFSKGSQVIAQYYQQLRLGYEGYKNUVME
NCQENASVLRLEGLEKTRGRFNIISKEIGVPLVAFSLKDNRQHNEFSETLRRFGWIVPAYTMMPNQAH
TUVLRVVIREDFSRILARLVRDIEKVLHELDTLPARVNAKLAAVEQAAANGSEVHKTDSEVQLEMIT
AWKKFVEEKKKKTNRVC

SEQ 17: Tomato *GAD*

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1 aaaaaatggt gttacaacaac aegtcgataa gagattcaga agagagcttg cactgtacat
61 ttgcataacaat atatgtacag gaaactttac ctaagttcaat aatgcctaaa aatccatgc
121 cgaagaagaac agcttacacg attgtaaacg acgcgttataat gtggatgtt aaccccgat
181 tgaatttacg ttccctttgtt agcacatgg tggagcccg gtgcgataag ctcataatgt
241 catccattaa taaaactatgtcgcacatgg atgcgtatcc tgcaccaactt gaaactccaa
301 atagatgtt taacatgtt gcaacatctt ttcatggccc ggttgggtat gatgagactg
361 cagggttggatg tggtagcatgg gtttacatcg aggcaataat gtttgtggc ctgttcttca
421 aacgcaaaatg gcaatcgaaa agaaaaacg aaggcaaaacc ttgcataaag ctaataatag
481 tcactggagc taatgtcgag gtcgtctggg aaaaatttgc aaggatattt gagggttagt
541 tgaaggaggtt gaaactaaaaa gaaggtact atgtatggc ccctgcggaa gaaatgtagaga
601 tagttggatgtt gaaatcaataa tggatgttgcg caatccttgg ttctactctg actggggagt
661 ttgaggatgtt gaaatgccttca aacgcgttcc ttcaaaaaaa gaaacaaggaa accggatgg
721 agacccatgtt cttatgttgcgatgtt gttttttttt gttttttttt ctctggccat
781 atctgttaatgg gttatgttgcg tttttttttt tttttttttt aatgttcgcg ggtcacaatgt
841 atggcccttgc atatgttgcg tttttttttt tttttttttt tttttttttt gttttttttt gttttttttt
901 atgaactcg ttttccatataa aactaccccttgg tttttttttt tttttttttt tttttttttt
961 tttttttttt tttttttttt tttttttttt tttttttttt tttttttttt tttttttttt
1021 agggttataatg gaaatgcgtatgg aaaaatgttccatataa aactaccccttgg tttttttttt
1081 tttttttttt tttttttttt tttttttttt tttttttttt tttttttttt tttttttttt
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1321 agaaaaatctt gtcacatgtt gacacacacg tttttttttt tttttttttt tttttttttt
1381 tcacatgtt gggatgttgcgatggatgtt tttttttttt tttttttttt tttttttttt
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1501 gggatgttgcgatggatgtt tttttttttt tttttttttt tttttttttt tttttttttt
1561 tagtatgtatgtt gggatgttgcgatggatgtt tttttttttt tttttttttt tttttttttt
1621 aatgttgcgtatggatgtt gggatgttgcgatggatgtt tttttttttt tttttttttt
1681 aatgttgcgtatggatgtt gggatgttgcgatggatgtt tttttttttt tttttttttt
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SEQ 18: Tomato GAD

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MVLTTTSIRSDSEESLHCTFASRYVQEPLPKFKMPKKSMPEKAYQIVNDELMDGNPRLNLASFVSTWM
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KRKWSQRKAEGKPFDPKNIVTGANVQVWKFARYFEVELKEVLLKEGYYVMDPAKAVEIVDENTTCV
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KNCLSNAKVLTLEGITKMRFDIVSKDVCVPPVAFSLRDSSKYTVFEVSEHRRFGWIVPAYTMPPDAEH
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KDIIKHWRKIAKGKKTSGVC

```

1) *Arabidopsis thaliana* ecotype Columbia glutamate decarboxylase 1 (GAD1) cDNA

Note: This is nucleic acid SEQ #1 and amino acid SEQ #2

A) LOCUS ATU10034
 ACCESSION U10034
 VERSION U10034.1 GI:497978
 REFERENCE

AUTHORS Arazi,T., Baum,G., Snedden,W.A., Shelp,B.J. and Fromm,H.
 TITLE Molecular and biochemical analysis of calmodulin interactions with the calmodulin-binding domain of plant glutamate decarboxylase
 JOURNAL Plant Physiol. 108 (2), 551-561 (1995)

1. From Arabidopsis genome sequencing project chromosome 5 (ACC# AB005238)
 LOCUS BAB10520
 DEFINITION glutamate decarboxylase 1 (GAD 1) (*Arabidopsis thaliana*)
 ACCESSION BAB10520
 PID g10177078
 VERSION BAB10520.1 GI:10177078
 REFERENCE 1 (sites)
 AUTHORS Sato,S., Kotani,H., Nakamura,Y., Kaneko,T., Asamizu,E., Fukami,M., Miyajima,N. and Tabata,S.
 TITLE Structural analysis of *Arabidopsis thaliana* chromosome 5. I. Sequence features of the 1.6 Mb regions covered by twenty physically assigned P1 clones
 JOURNAL DNA Res. 4 (3), 215-230 (1997)

2) *Arabidopsis thaliana* ecotype Columbia glutamate decarboxylase 2 (GAD2) cDNA

Note: This is nucleic acid SEQ #3 and amino acid SEQ #4

- A) LOCUS ATU46665
 ACCESSION U46665
 VERSION U46665.1 GI:1184959
 REFERENCE
 AUTHORS Turano,F.J. and Fang,T.K.
 TITLE Characterization of two glutamate decarboxylase cDNA clones from *Arabidopsis*
 JOURNAL Plant Physiol. 117 (4), 1411-1421 (1998)
- B) LOCUS ATU49937
 ACCESSION U49937
 VERSION U49937.1 GI:1236618
 REFERENCE
 AUTHORS Zik,M., Arazi,T., Snedden,W.A. and Fromm,H.
 TITLE Two isoforms of glutamate decarboxylase in *Arabidopsis* a regulated by calcium/calmodulin and differ in organ distribution
 JOURNAL Plant Mol. Biol. 37 (6), 967-975 (1998)
- C) From Arabidopsis genome sequencing project
 ACCESSION #AC009513
 Part of chromosome # 1
 note="Identical to gblU46665 glutamate decarboxylase 2 (GAD 2)
Arabidopsis thaliana. and ESTs gblW43856, gblN37724,
 gblZ34642 and gblR90491 come from this gene."
 /protein_id="AAF06056.1"
 /db_xref="GI:6227020"

3) *Arabidopsis thaliana* ecotype Columbia putative glutamate decarboxylase (putative GAD3) DNA From *Arabidopsis* genome sequencing project

Note: This is nucleic acid SEQ #5 and amino acid SEQ #6

ACCESSION #AC006532

Part of chromosome #2

/product="putative glutamate decarboxylase"

/protein_id="AAD20093.1"

/db_xref="GI:4406783"

4) *Arabidopsis thaliana* ecotype Columbia putative glutamate decarboxylase (putative GAD4) DNA From *Arabidopsis* genome sequencing project

Note: This is nucleic acid SEQ #7 and amino acid SEQ #8

ACCESSION #AC006532

Part of chromosome #2

/product="putative glutamate decarboxylase"

/protein_id="AAD20099.1"

/db_xref="GI:4406789"

5) *Arabidopsis thaliana* ecotype Columbia putative glutamate decarboxylase (putative GAD5) DNA From *Arabidopsis* genome sequencing project

Note: This is nucleic acid SEQ #9 and amino acid SEQ #10

ACCESSION #AB026646

Part of chromosome #3

/evidence=not_experimental

/product="glutamate decarboxylase"

/protein_id="BAB02870.1"

/db_xref="GI:9294589"

6) Tobacco (*Nicotiana tabacum*) glutamate decarboxylase isozyme 1 (NtGAD1) cDNA

Note: This is nucleic acid SEQ #11 and amino acid SEQ #12

A) LOCUS AF020425

ACCESSION AF020425

VERSION AF020425.1 GI:3252855

REFERENCE

AUTHORS Yun,S.J. and Oh,S.H.

TITLE Cloning and characterization of a tobacco cDNA encoding calcium/calmodulin-dependent glutamate decarboxylase

JOURNAL Mol. Cells 8 (2), 125-129 (1998)

B) LOCUS NTU54774
 ACCESSION U54774
 VERSION U54774.1 GI:1777920
 REFERENCE
 AUTHORS Dharmasiri,M.A.N., Lu,Y.T. and Harrington,H.M.
 TITLE Cloning and sequencing of a tobacco cDNA encoding glutamate
 decarboxylase
 JOURNAL Unpublished

7) Tobacco (*Nicotiana tabacum*) glutamate decarboxylase isozyme 2 (NtGAD2)
 cDNA

Note: This is nucleic acid SEQ #13 and amino acid SEQ #14

LOCUS AF020424
 ACCESSION AF020424
 VERSION AF020424.1 GI:3252853
 REFERENCE 1 (bases 1 to 1771)
 AUTHORS Yun,S.J. and Oh,S.H.
 TITLE Cloning and characterization of a tobacco cDNA encoding
 calcium/calmodulin-dependent glutamate decarboxylase
 JOURNAL Mol. Cells 8 (2), 125-129 (1998)

8) Petunia (*Petunia hybrida*) glutamate decarboxylase cDNA

Note: This is nucleic acid SEQ #15 and amino acid SEQ #16

2. LOCUS PETGADX
 ACCESSION # L16797
 VERSION # L16797.1 GI:294111
 KEYWORDS glutamate decarboxylase.
 REFERENCE
 AUTHORS Baum,G., Chen,Y., Arazi,T., Takatsuki,H. and Fromm,H.
 TITLE A plant glutamate decarboxylase containing a calmodulin binding
 domain: cloning, sequence, and functional analysis
 JOURNAL J. Biol. Chem. 268, 19610-19617 (1993)

B) LOCUS PETGLUDECA
 ACCESSION L16977
 VERSION L16977.1 GI:309679
 REFERENCE
 AUTHORS Baum,G., Chen,Y., Arazi,T., Takatsuki,H. and Fromm,H.
 TITLE A plant glutamate decarboxylase containing a calmodulin-binding
 domain: cloning sequence and functional analysis
 JOURNAL J. Biol. Chem. (1993)

9) Tomato (*Lycopersicon esculentum*) glutamate decarboxylase-like protein LEGDL
 cDNA

Note: This is nucleic acid SEQ #17 and amino acid SEQ #18

ACCESSION X80840

VERSION X80840.1 GI:993002

REFERENCE

AUTHORS Gallego,P.P., Whotton,L., Picton,S., Grierson,D. and Gray,J.E.

TITLE A role for glutamate decarboxylase during tomato ripening: the characterization of a cDNA encoding a putative glutamate decarboxylase with a calmodulin-binding site

JOURNAL Plant Mol. Biol. 27 (6), 1143-1151 (1995)

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